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Vector-magnetometry determination of magnetization processes in $\text{Pr}_6\text{Ni}_2\text{Si}_3$ and $\text{Nd}_6\text{Ni}_2\text{Si}_3$ ¹ Y. JANSSEN, K. W. DENNIS, R. PROZOROV, P. C. CANFIELD, R. W. MCCALLUM, Ames Laboratory, Iowa State University, Ames, IA 50011 — Hexagonal $\text{Pr}_6\text{Ni}_2\text{Si}_3$ and $\text{Nd}_6\text{Ni}_2\text{Si}_3$ order magnetically at 40 and 85 K, respectively. At 5 K, the magnetic order of both compounds appears to have a ferromagnetic component parallel to the hexagonal c-axis, and an antiferromagnetic component perpendicular to it. In both compounds, at 5 K and in a magnetic field of $\sim 2\text{--}3$ T, applied perpendicular to the c-axis, a magnetic transition occurs. Using a QD-MPMS equipped with a transverse pickup coil system, we have studied the behavior of the magnetization vector in single-crystal samples during this transition. In both cases, the magnetization vector becomes anomalously *longer* during the transition. This indicates the transition may be related to an antiferromagnetic component of the magnetic order, which is consistent with the magnetic order having both antiferro and ferromagnetic components.

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